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*Economic Policy Reform and
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Evaluation of the functioning of current “single buyer” wholesale electricity market in Mongolia

January 2006
Ulaanbaatar, Mongolia

Project: Mongolia Economic Policy Reform and Competitiveness Project (EPRC)
Report Title: ***Evaluation of the functioning of current “single buyer” wholesale electricity market in Mongolia***
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ABBREVIATIONS AND ACRONYMS

| | |
|------|-----------------------------|
| CES | Central Energy System |
| CHP | Combined Heat Plant |
| CMS | Cash Management System |
| EES | Eastern Energy System |
| ERA | Energy Regulatory Authority |
| GoM | Government of Mongolia |
| JSC | Joint Stock Companies |
| MZBA | Main Zero Balance Account |
| NDC | National Dispatch Center |
| UES | United Energy System |
| WES | Western Energy System |

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BACKGROUND

1.1. General overview of Mongolian electric power system

The electric power system in Mongolia consists of three independent electric power systems: the Central Energy System (CES), the Western Energy System (WES), and the Eastern Energy System (EES). In 2001 the Government of Mongolia (GoM) has taken major steps toward restructuring the energy sector by passing the 2001 Energy Law, establishing the Energy Regulatory Authority (ERA) and establishing a set of rules and regulations to promote private sector investments in the energy sector. The GoM has created 18 Joint Stock Companies (JSC) including generation, transmission and distribution entities and National Dispatch Center or NDC, which together comprise the energy sector.

The share entitlements of these companies (except NDC) were distributed as follows:

- 41% - to the Ministry of Infrastructure
- 39% - to the State Property Committee
- 20% - to the Ministry of Finance and Economy.

The NDC is responsible for dispatch of the CES transmission network. It was created as a LLC and its shares were distributed to the Ministry of Infrastructure (51%) and to the State Property Committee (49%).

The main Mongolian electric system is operated by the Central Energy System (CES) which represents 80% of all Mongolia electricity supply. The CES power supply is comprised of five coal burning generating plants and interconnection to UES of Russia. The other two networks – EES and WES are quite small. WES operates on imports of electricity from Russia, EES has one CHP with installed nameplate capacity of 36 MW, of which only 7 MW is available.

For the purposes of evaluation of market model in Mongolia the focus is on the CES system and its entities. Total installed nameplate capacity of CES is 753 Mw of which only 633 Mw are available. There is also a contract with Inter RAO of Russia to supply up to 160 Mw of capacity through a double circuit 220 KV line, normally operating at 110 KV level. The contract is in effect through December 31, 2007. There is also a contract with Inter RAO for the export of power. The export is utilized to transfer excess power caused by heat demand during the off-peak electricity demand hours. Since the contractual price for exported power is very low, the export is in effect used to dump power.

1.2. Adequacy of generating resources to maintain reliability and quality of power supply

The existing capacity of CHP plants is generally sufficient from the point of view of installed capacity requirements of the power system with the annual peak of the order of 550 MW, which occurred this season in December 2005. However the power plants' equipment is in most part very aged, the youngest plant – Ulaanbaatar CHP 4 commenced its operation in 1981 and is the only plant capable of participating in frequency regulation, perform load following and to provide limited operating reserve. There currently is no capability to regulate system frequency and to withstand contingencies without reliance on the interconnection with Russia.

1.3. Transmission System and NDC

The CES transmission system interconnects three main load centers - Ulaanbaatar, Darkhan and Erdenet and the power plants in these cities by a 220 KV transmission line ring.

Transmission voltages are 220 KV and 110 KV, distribution voltages are 35 KV, 10 KV and 6 KV.

The National Dispatch Center is responsible to coordinate daily system operation of all power and heat sector entities which includes the real time coordination of the power plants operation, transmission and distribution switching operations, operation of the heat transmission network in coordination with the CHP operations. The currently available hardware and software systems at NDC were not originally designed for the control of the power system network. All communications and data acquisition are mostly communicated by telephone and fax.

The NDC is also responsible for providing the information necessary to settle spot market transactions within the context of the wholesale electric power market which is currently structured on a “single buyer market” model. These responsibilities will be discussed in more details in the sections below.

SECTION I: THE “SINGLE BUYER MARKET” MODEL – DESCRIPTION AND ASSESSMENT OF ITS EFFICIENCY

2.1. Transition to the “Single Buyer Market”

Immediately upon structural and functional reorganization of the national electric power system, the wholesale market transactions were implemented based on the system of vested bilateral obligations between distribution companies and generators. That system proved to be short-lived. Distribution companies were plagued with retail revenue collection problems. That and possible misappropriation of funds by distribution companies caused the situation where generating companies consistently under-collected a significant portion of the revenue needed not only to maintain the equipment but to pay their fuel suppliers.

Some generating companies also complained that the assignments of these bi-lateral obligations were unfair in the way that some generating companies were assigned most of the contracts with distribution companies with relatively high collection rates while other generating companies receive contracts with distribution companies with low collection rates. Although, as we were told, these bi-lateral obligations were legally enforceable in practice it was nearly impossible to obtain relief through the legal system. On average generators used to collect approximately 60 to 70% of the payments due them.

2.2. Description of the “Single Buyer Market”

Facing the above described problems in 2001, the ERA adopted a market model which became known in Mongolia as the “Single Buyer Market”. Under this model there are no longer any bi-lateral obligations between generating and distribution companies. The flow of funds under this model is implemented through a Cash Management System (CMS) under which retail customers of state owned distribution companies deposit their payments into the so-called “zero balance” accounts established by each distribution company. These accounts prohibit any withdrawals by distribution companies. At the end of each day funds from these accounts are transferred into what is called “Main Zero Balance” account (MZBA), established in the Mongolian Savings Bank. Private distribution companies are not mandated to establish “zero balance” accounts and are allowed to make direct payments to the “Single Buyer”. Disbursements to the market participants (distribution and generation companies) and to the dispatching entity are made from MZBA in accordance with the pre-agreed allocation formula approved by licensees at their annual meetings, by the Transmission Company, which acts as if it were a Single Buyer. The CMS ensures that each entity receives a “fair” share of collections. However, the only entity that receives full payment due is a supplier of imported power. The amount of payments to other entities varies depending on retail revenue collection.

It has to be mentioned that because the funds allocation formula is based upon forecasted levels of consumption and generation, within the framework of the “Single Buyer” market, it is also necessary to operate a spot market, where generation companies settle deviations from planned output. Only generating companies participate in this market under the rules approved by ERA. The settlement between concerned generation companies is performed by adjusting the allocation of revenue due to these companies.

According to representatives of the ERA, Ministry of Fuel and Energy and generation companies, since the CMS system was introduced the collection rate of funds available to the “Single Buyer” for disbursement has improved significantly. For example according to the management of Ulaanbaatar CHP 4, the station now receives 97% of the revenue that would be due it based on generated energy and the approved generation tariff.

2.3. Assessment of the efficiency of the “Single Buyer” Market model

It has to be noted that characterization of the current system as a “Single Buyer” market is somewhat of a misnomer. The transmission company is not taking a title to the energy produced by generation companies, and is not legally responsible to pay them for what was actually supplied. It just simply allocates what funds are available to it in the MZBA redundant. This system also cannot be characterized as a power exchange in the traditional meaning of this word, since the settlement by funds allocation formula doesn’t track payments to the actual amount of energy produced and consumed. In fact this system represents an operation of a vertically integrated utility which is functionally unbundled into several business units and whose corporate management vested responsibility to distribute collected retail revenue among business units in accordance with the pre-approved formula into only one of these business units (in this case - transmission company).

As such, this system has all advantages and disadvantages associated with the reliance by consumers on the operation of a vertically integrated utility.

The advantages of the current system are:

- Relative simplicity
- Allows easy balancing of supply and demand and settlement at deviations through the simple spot market settlement process
- Prevents misappropriation of retail revenue
- Provides financial stability to power sector entities
- Contributes to maintaining reliable power system operation under difficult local conditions

The primary disadvantages of the current system:

- It does not foster competition
- It allows government intervention into the settlement procedure
- It doesn’t promote market relationship between distribution and generation entities
- It doesn’t provide non-privatized distribution companies with sufficient incentives to improve collection of retail revenue

As was noted above, within the framework of the system, a spot market for energy to settle the deviation between planned and actual generation also is in operation. Only generators “participate” in this spot market.

The spot market functions in the following way: The daily regime planning group of the NDC develops generation dispatch schedules for the next “operating” day. During the “operating” day dedicated staff within this group tracks all deviations from the dispatch schedule, prices the energy deviations in accordance with the spot market rule developed by ERA staff and approved by the ERA and submits this data to the transmission company to be used subsequently for adjustments to funds distributed among generators as part of the funds allocation process. The spot market rule is somewhat simplistic and vague and doesn’t take into account all possible situations. According to the rule, energy deviations should be priced at the respective energy tariffs or by combined tariff if the two-part tariff is not yet in place. That doesn’t seem to be reasonable. As was noted above only generation deviation is settled through the spot market. Deviations on demand side are simply ignored. It is obvious that current spot market arrangements leave room for improvement.

SECTION II: CONCLUSION AND RECOMMENDATIONS

From the numerous discussions with power sector entities representatives it became obvious that implementation of the “Single Buyer Market” model played a positive role in the development of the national power system during difficult times.

It prevented the power system infrastructure from financial collapse and helped to maintain reliable operation of the power system by introducing financial stability to the power sector. However further movement toward privatization and introduction of competition into the power sector would require an introduction of market tools into the sector operation, such as bilateral contracts between distribution and generating companies, competitive bids in the spot market, participation of load serving entities in the spot market, etc. These developments can’t be supported within the framework of the current system. If distribution companies are to be privatized the “zero balance” accounts will have to be abandoned or at least to a large degree, modified. Investors in new generation like to have an opportunity to enter into bi-lateral contracts with buyers and receive direct payments specified in contractual terms. It is obvious that the current system is in need of changes. In our opinion the current system should be transformed to a system based on bi-lateral contracts between generation and distribution companies, supplemented by an orderly spot market, where both generation and distribution entities settle their deviation. In the beginning, bi-lateral contracts and the spot market could be based on regulated tariffs (two-part tariffs will have to be developed) and within several years gradually transition to a mostly competitive market.

Preparatory work needs to be done before the new system is implemented, i.e., examination of existing legal arrangements, introduction of two-part tariffs for generation, development of market rules and procedures, development of a standard contract for sale/purchase of electricity, training of NDC staff, upgrading NDC technical capabilities to control real time power system operation and to perform settlement and billing functions. A system of third-party financial guaranties would have to be developed. Alternatively some elements of the current cash management system may be employed as part of contractual arrangements.

There is no urgent need to rush a transition until all above listed milestones are accomplished. Only after market participants can demonstrate accountability, honor their contractual obligations and pursue disputes in accordance to existing regulations and laws should the new market model be implemented.